

**REMARKS**

This is a full and timely response to the Office Action mailed July 7, 2004, submitted concurrently with a three month Extension of Time to extend the due date for response to January 7, 2005.

The specification has been amended to correct a clerical error. Support for the amendment is readily apparent from the teachings of the specification. For the Examiner's convenience, Applicant has also set forth specific references to the specification in the remarks below in support of the amendment.

No claims have been amended in this response. Thus, claims 1, and 3-6 remain pending in this application.

In view of this Amendment, Applicant believes that all pending claims are in condition for allowance. Reexamination and reconsideration in light of the above amendments and the following remarks is respectfully requested.

**Objection under 35 U.S.C. §132 and Rejection under 35 U.S.C. §112**

The specification is objected to under 35 U.S.C. §132, and claims 1 and 3-6 are rejected under 35 U.S.C. §112, first paragraph, both on new matter grounds. Applicant respectfully traverses both the objection and rejection. Applicant notes that since this objection and rejection relate to the same amendment (i.e. *the amount of Co in the first electrolyte layer is 0 or 80 % or less than  $0\% \leq Co \leq 80\%$  with respect to the amount of Co in the second electrolyte layer*) effected to both the specification and claims, Applicant has responded to this §132 objection and §112 rejection together based on the comments below. Please note that the comments and references to the specification below provide objective evidence in support of both the claimed range and the declaration of 05/17/04 by clarifying the data presented in the specification (in particular, the data from Example 1).

As the Examiner noted in the Interview Summary dated November 4, 2004, Example 1 discloses somewhat confusing data (see page 13, lines 9 to 11, of the specification) which Applicant has determined to be caused by an incorrect description. Example 1 discloses that “[T]he first electrolyte layer 16a was made of a compound represented by  $La_{0.75}Sr_{0.15}Ga_{0.775}Mg_{0.125}Co_{0.1}O_{3-d}$ . The second electrolyte layer 16b was made of an oxide ionic mixed conductor represented by  $La_{0.8}Sr_{0.2}Ga_{0.8}Mg_{0.15}Co_{0.05}O_{3-d}$ .” However, such a description is incorrect since

based on Applicant's review of the specification, the chemical formulae of the compounds comprising the first and second electrolyte layers have been inadvertently switched due to a clerical error. In other words, the description on page 13, lines 9-11 of the specification should be changed to "[T]he first electrolyte layer 16a was made of a compound represented by  $\text{La}_{0.8}\text{Sr}_{0.2}\text{Ga}_{0.8}\text{Mg}_{0.15}\text{Co}_{0.05}\text{O}_{3-d}$ . The second electrolyte layer 16b was made of an oxide ionic mixed conductor represented by  $\text{La}_{0.75}\text{Sr}_{0.15}\text{Ga}_{0.775}\text{Mg}_{0.125}\text{Co}_{0.1}\text{O}_{3-d}$ ." Thus, according to the corrected description, the weight ratio between the cobalt in the first electrolyte layer relative to the cobalt in the second electrolyte layer is 50% (0.05/0.1).

It is clear from the teachings in the specification that original description on page 13, lines 9-11 of the specification is a clerical error. The present specification contains many passages, which recite that the amount of cobalt in the first electrolyte layer is less than the amount of cobalt in the second electrolyte layer. For example, the specification, on page 6, third paragraph, discloses that "*the amount of Co in the first electrolyte layer is less than that in the second electrolyte layer*". Also, in the fourth paragraph, the specification discloses that "*the amount of Co preferably decreases gradually from the second electrolyte layer to the first electrolyte layer in the vicinity of the interface between the first electrolyte layer and the second electrolyte layer*". Likewise, on page 10, second paragraph, the specification discloses that "*the amount of Co in the first electrolyte layer 16a is less than that in the second electrolyte layer 16b.*" Further, the specification, on page 11, second paragraph, teaches that "[W]hen the alumina setter is arranged onto the green sheet, and the alumina setter and the green sheet are sintered, Co in the green sheet diffuses towards the alumina setter. Thereby, an upper layer of the green sheet containing a small amount of Co becomes the first electrolyte layer 16a, and the remainder of the green sheet becomes the second electrolyte layer 16b." Still further, on page 12, second paragraph, the specification discloses that "[T]he second electrolyte layer 16b contains more Co than the first electrolyte layer 16a."

These descriptions are also supported by the descriptions in Comparative Examples 1 and 2 of the specification. The comparative fuel cell of Comparative Example 1 was produced in a manner identical to that of Example 1, except for the first electrolyte layer. That is, the comparative fuel cell of Comparative Example 1 comprises only the second electrolyte layer, which is the same as that used in the fuel cell of Example 1. FIG 6 is a graph showing the power generation characteristics of the fuel cell in Comparative Example 1. In FIG. 6, the compound used for the second electrolyte layer is indicated by  $\text{La}_{0.75}\text{Sr}_{0.15}\text{Ga}_{0.775}\text{Mg}_{0.125}\text{Co}_{0.1}\text{O}_{3-d}$ .

Further, the comparative fuel cell of Comparative Example 2 was produced in a manner identical to that of Example 1, except for the second electrolyte layer. That is, the comparative fuel cell of Comparative Example 2 comprises only the first electrolyte layer, which is the same as that used in the fuel cell of Example 1. FIG 7 is a graph showing the power generation characteristics of the fuel cell in Comparative Example 2. In FIG. 7, the compound used for the first electrolyte layer is indicated by  $\text{La}_{0.8}\text{Sr}_{0.2}\text{Ga}_{0.8}\text{Mg}_{0.15}\text{Co}_{0.05}\text{O}_{3-d}$ . Therefore, the descriptions from Comparative Examples 1 and 2 clearly show that the original description on page 13, lines 9-11, of the specification is a clerical error.

It should also be noted that FIG. 6 shows that the Open Circuit Voltage ("OCV") of the fuel cell in Comparative Example 1 is low (1.04 V). The low OCV is caused by a large amount of Co, that is, because the c value of the chemical formula of FIG. 6 is large, i.e. 0.1. In contrast, FIG. 7 shows that the OCV voltage of the fuel cell in Comparative Example 2 is high (1.24V). The high OCV is caused by a small amount of Co, that is, because the c value of the chemical formula of FIG. 7 is small, i.e. 0.05. These experiment results correspond to the technical viewpoints of the present invention and the teachings of the present specification. From these results, it is obvious that the switching of the chemical formulae of the first and second electrolyte layers in Example 1 is a clerical error.

Therefore, the ratio of the cobalt amount in the first electrolyte layer relative to the cobalt amount in the second electrolyte layer in Example 1 is 50%, which is in the range of 0 to 80% set forth in the claims.

Additional descriptions in the specification also support the claimed range of the "amount of Co in said first electrolyte layer being  $0\% \leq \text{Co} \leq 80\%$  with respect to an amount of Co in said second electrolyte layer". In the paragraph bridging pages 8 and 9, the specification discloses that "[In] the general formula (1), . . . c indicates the percentage of Co and is . . . (preferably in a range from 0.03 to 0.1)". In other words, the maximum preferable amount of Co is 0.1. In addition, there is also a description on page 9, last line, to page 10, first line, of the specification that "when the c value is 0.10 or less, the ionic transference number is 0.9 or greater". A compound having an ionic transference number of 0.9 or greater is an excellent ionic conductor. Thus, it is clear from these descriptions that in order to act as an excellent electrolyte of a fuel cell, the c value of the compound should be 0.1 or less.

FIG. 2 shows that in order to make the ionic transference number be 0.9 or greater, the c value must be 0.08 or less. In other words, Applicant has found from the experimental

results shown in FIG. 2 that when the c value of the second electrolyte layer (which contains a large amount of cobalt) is 0.1, the maximum c value of the first electrolyte layer (which contains a small amount of cobalt) is 0.08. The minimum amount of cobalt is 0. Therefore, the amount of cobalt of the first electrolyte layer is in a range of 0 to 0.08 relative to the amount of cobalt (that is, 0.1) of the second electrolyte layer. From these experimental results, Applicant has discovered that the amount of cobalt in the first electrolyte layer is preferably in a range of 0 to 0.08, relative to the amount of cobalt (0.1) in the second electrolyte layer. This translates to the claimed range of the *“amount of Co in said first electrolyte layer being  $0\% \leq Co \leq 80\%$  with respect to an amount of Co in said second electrolyte layer”*. Moreover, when the amount of cobalt in the first electrolyte layer is smaller, the ionic transference number approaches 1, and thereby the OCV tends to increase, as shown in FIGS. 3 to 7.

Applicant also wishes to note that the original language on page 5 of the specification and in claim 2 can be interpreted to literally support the claimed range of *“amount of Co in said first electrolyte layer being  $0\% \leq Co \leq 80\%$  with respect to an amount of Co in said second electrolyte layer”*. Prior to the Amendment of November 18, 2003, the phrase *“the amount of Co in the first electrolyte layer is preferably 0 or 80% or less than the amount of Co in the second electrolyte layer”* can clearly be interpreted to mean *“the amount of Co in the first electrolyte layer is preferably “0”, or “80% or less” than the amount of Co in the second electrolyte layer”*. The range of “0”, or “80% or less” is equivalent to range of  $0\% \leq Co \leq 80\%$  set forth in the amended claims. Likewise, the original claim limitation (in original claim 2) *“an amount of Co in said first electrolyte layer is 0 or 80% or less with respect to an amount of Co in said second electrolyte layer”* can also clearly be interpreted to mean *“an amount of Co in said first electrolyte layer is “0”, or “80% or less” with respect to an amount of Co in said second electrolyte layer”*. Accordingly, Applicant submits that the original disclosure and claims also support the claimed range of *“amount of Co in said first electrolyte layer being  $0\% \leq Co \leq 80\%$  with respect to an amount of Co in said second electrolyte layer”*, and thus, the amendments to the specification and claims have not introduced new matter into the disclosure of the present invention.

To provide additional evidence in further support of the claimed range (i.e.  $0\% \leq Co \leq 80\%$ ), a verified English translation of the Priority Document (Japanese Patent Application No. 2000-193750; Japanese Unexamined Patent Application, First Publication No. 2002-15756), is submitted herewith for the Examiner’s review and consideration.

**Rejection under 35 U.S.C. §103**

Claims 1 and 3-6 are rejected under 35 U.S.C. §103(a) as allegedly being obvious over DE 19949431. Applicant respectfully traverses this rejection.

DE 19949431 is not a proper §102(e)/103 reference because DE 19949431 has the same assignee as this Application. Also, DE 19949431 is the German equivalent to U.S. Patent 6,287,716 which is the subject of the obviousness-type double patenting rejection below.

The MPEP at 2136.01 states:

For applications filed on or after November 29, 1999, a provisional rejection under 35 U.S.C. 102(e)/103 is not proper if the application contains evidence that the application and the prior art reference were owned by the same person, or subject to an obligation of assignment to the same person, at the time the invention was made.

Similarly, MPEP §2136.02 states that

For applications filed on or after November 29, 1999, if the applicant provides evidence that the application and the prior art reference were owned by the same person, or subject to an obligation of assignment to the same person, at the time the invention was made, any rejections under 35 U.S.C. 102(e)/103 based upon such a commonly owned reference should not be made or maintained.

Evidence required to establish common ownership by the Applicant is discussed in MPEP §706.02(l)(2), which states that a statement can be made by an attorney of record, and that the statement concerning common ownership should be clear and conspicuous, for example, on a separate piece of paper or in a separately labeled section. Furthermore, Applicant may, but is not required to, submit further evidence, such as assignment records.

As discussed above, §1.131 or §1.132 affidavits are inappropriate to overcome this rejection.

**Statement of Common Ownership**

Application 09/891,501, filed June 27, 2001, and DE 19949431 to Hashimoto et al., were, at the time the invention of Application 09/891,501 was made, owned by Mitsubishi Materials Corporation of Japan.

Accordingly, withdrawal of this rejection is respectfully requested.

**Obviousness-Type Double Patenting Rejection**

Claims 1, 3, 4 and 6 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-3 of U.S. Patent No. 6,287,716.

Applicant respectfully traverses this rejection.

However, in order to expedite prosecution, Applicant has filed a Terminal Disclaimers which renders moot this rejection.

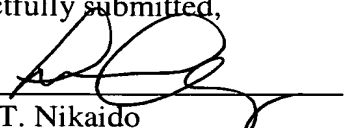
Thus, withdrawal of this rejection is respectfully requested.

### CONCLUSION

For the foregoing reasons, all the claims now pending in the present application are believed to be clearly patentable over the outstanding rejections. Accordingly, favorable reconsideration of the claims in light of the above remarks is courteously solicited. If the Examiner has any comments or suggestions that could place this application in even better form, the Examiner is requested to telephone the undersigned attorney at the below-listed number.

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Respectfully submitted,

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Attachments: Verified English Translation of the Certified Priority Document  
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